

**O I P E J C 6 7 J U N 0 4**  
**APR 30 2004**

<b>Referee's Recommendation</b>		<b>For Legal Operation Use</b>	
Name: <i>[Signature]</i>	Date: <i>1/17/00</i>	Docket Number: <i>EUSO 3822-RmOT</i>	
Check Recommendation:		Date Opened: <i>2000-00-10</i>	
<input checked="" type="checkbox"/> File: Disclosure Complete	<input type="checkbox"/> Did Not File (Specify Reasons)	<i>INW/JPI</i>	
<input type="checkbox"/> File: Prepare Full Disclosure	<input type="checkbox"/> Review Further		
<input type="checkbox"/> Publish in TDB	<input type="checkbox"/> Keep as Formal Trade Secret		
Referee's Comments: _____			

*Note: See special*

**EXHIBIT**  
*1*

## Ericsson Inc. Invention Disclosure Cover Form

1. Invention Title: Lens Apparatus For Camera Phone

2. Disclosure Submitted by (Add additional sheets if more than three inventors):

	Inventor No. 1	Inventor No. 2	Inventor No. 3
(a) Full Name	Scott Vance	Charles Hunt	
(b) Home Address	132 Woodland Dr Cary, NC 27513 <i>7031</i>	4604 Pebble Ct. Raleigh, NC.  27613	
(c) Work Phone	(919)472-1386	919-472-7959	
(d) Citizenship	USA	USA	
(e) 5-Digit Pay No.	52613	21340	
(f) Manager	Mark Weadon	Chris Collins	
(g) Bus. Unit	EUS/V	EUS/C	
(h) Cost Center	11009	11018	

3. Important—For purposes of properly assigning any issued patent for this invention, please check which organization funded the work on this invention: ☐ EUS/SC ☐ ECS ☐ RPRS ☐ ERA(BMOA, BMOG, DWOS) ☐ Global Resources (BRL) ☐ Other (specify name)

4. Date invention conceived (mm/dd/yy): 11/15/99

5. Date invention reduced to practice: 12/10/99

6. Identify (including dates) any past or anticipated disclosure outside the company, such as publication, offer for sale, actual sale, discussions with business partners, etc.: Disclosure of a model of such a device on the Ericsson home page: [http://www.ericsson.com/pressroom/phli\\_pcoco.shtml](http://www.ericsson.com/pressroom/phli_pcoco.shtml). On the page it was a concept phone. This proposal is an implimentation.

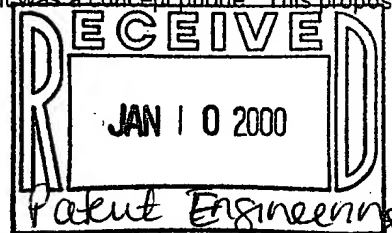
7. Invention made using government or non-Ericsson funding?: No

8. Present or proposed use of the invention (identify products and dates):

9. Identify related invention disclosures of which you are aware:

10. Please attach to this cover form your invention disclosure, along with any other relevant documentation (see "IPR at RTP" Web site for additional information on writing disclosures).

The invention described in the attached invention disclosure is hereby submitted under my employment agreement with Ericsson Inc.



Inventor's Full Signature	Date	Witnessed, read, understood and signed by	Date
(1) <i>[Signature]</i>	<i>Jan 11 '00</i>	(1) <i>[Signature]</i>	<i>000110</i>
(2) <i>[Signature]</i>	<i>JAN 11, 2000</i>	(2) <i>[Signature]</i>	<i>1/10/00</i>
(3)		(3)	

Prepared RT/EUS/V Lens apparatus for camera phone – Scott Vance, Charles Hunt – 2-1386/ 2-7959	Date Jan 5, 2000	Rev A	EUS no. (For Patent Engineering Use Only) EUS03822
Approved	Checked		File

## Lens apparatus for camera phone.

### 1. What problem is solved by your invention? Describe generally the nature of your invention and what area of technology it addresses.

Companies in Japan have introduced camera phones to take advantage of high data-rate systems. In the coming years, WCDMA and other technologies will make it trivial to send pictures and other data at high speeds over wireless networks. This will help to encourage a new breed of phones. Some of these phones will have build in cameras which will allow the user to look at the person whom they are speaking with. These phones will also allow the user to take pictures.

When taking pictures, one generally likes to see what the picture looks like – i.e. they want the LCD on the opposite side of the device as the display device. However, when one is holding a videoconference, it is necessary to have the camera on the same side of the device as the display device. This invention describes a method that allows one to have the camera on both the same side and the opposite side as the display device in an efficient and novel manner.

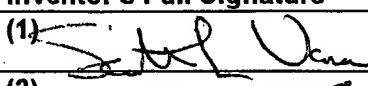
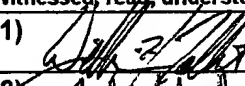
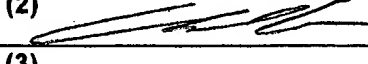
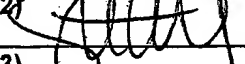
### 2. How was this problem solved before (inside or outside Ericsson)? Cite any known inventions for which yours is a replacement.

On video cameras, newer displays have swivels, which allows one to physically rotate the display so that it can face multiple directions. To the best of my knowledge, there are no camera phones which the image to be viewed both from the camera and non-camera side of the device.

### 3. What were the shortcomings of those earlier solutions? Explain why the known inventions are insufficient. What was the motivation for your invention?

While it is technically possible to make a display that will swivel on a cell phone, this would be difficult given the space and reliability constraints. Color displays have a number of connections which would almost invariably necessitate usage of a flex. This in turn requires that one turn the display one direction to move from position A to B and the opposite direction to move back from position B to A. The design of the flex is usually difficult and often unreliable.

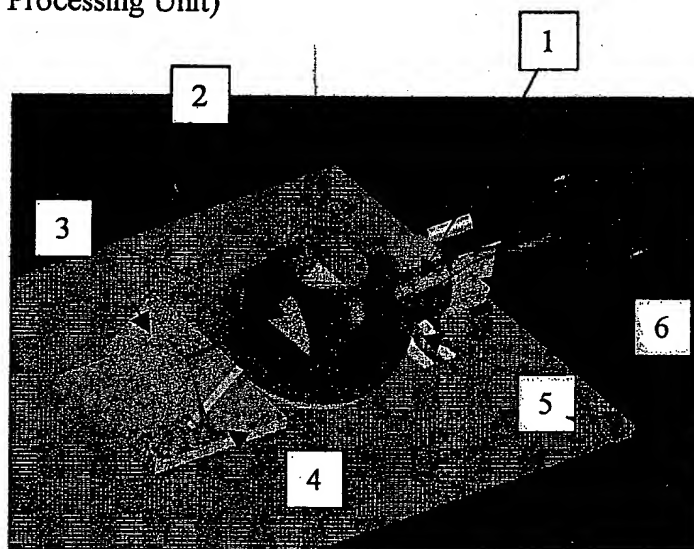
### 4. What is your invention and how is it better than those prior solutions? Describe in detail the structure and operation of your invention, including the features which make it advantageous over known inventions. Be specific in your description of how to make and use your invention. Attach drawings, flow charts, block diagrams, schematics, etc.

Inventor's Full Signature	Date	Witnessed, read, understood and signed by	Date
(1) 	JAN 11 '00	(1) 	000110
(2) 	JAN 11, 2000	(2) 	1/10/00
(3)		(3)	

Prepared RT/EUS/V Lens apparatus for camera phone – Scott Vance, Charles Hunt – 2-1386/ 2-7959	Date Jan 5, 2000	Rev A	EUS no. (For Patent Engineering Use Only) EUS03822
Approved	Checked		File

Our invention consists of the following members:

- 1) Rotating Lens Cover (Optional – see Additional Notes #3)
- 2) Camera Lens
- 3) 2 mirrors (1 = mandatory, 2<sup>nd</sup> = optional if CCD is placed upright within the phone)
- 4) CCD or other Camera
- 5) Position switch (2 contacts = minimum)
- 6) Detent (optional)
- 7) CPU (Central Processing Unit)



The camera lens is situated with a mirror behind it such that it deflects the light at about a 45 degree angle. When the lens is rotated 180 degrees such that light enters from the opposite side of the phone or other device, the mirror is rotated with the lens and serves to deflect the light in the same direction.

The second mirror reflects light coming from the first mirror toward the CCD camera on the PCB. The position switch communicates the rotational position of the lens to the CPU. In a typical embodiment, there would be a minimum of two positions for this switch. If there were 3 or more positions, it would be possible to tell whether the lens were in use (i.e. whether or not it was covered by the lens cover) in addition to detecting the direction the lens was facing.

Inventor's Full Signature	Date	Witnessed, read, understood and signed by	Date
(1) <i>Scott Vance</i>	Jan 11 '00	(1) <i>[Signature]</i>	000110
(2) <i>[Signature]</i>	JAN 11, 2000	(2) <i>[Signature]</i>	1/10/00
(3)		(3)	

Prepared RT/EUS/V Lens apparatus for camera phone – Scott Vance, Charles Hunt – 2-1386/ 2-7959	Date Jan 5, 2000	Rev A	EUS no. (For Patent Engineering Use Only) EUS03822
Approved	Checked		File

The CPU takes the position of the switch and uses this information to format the input from the CCD. Depending on the position of the switch, the CPU may invert the image so that it appears to the user to be upright.

Detailed description of the different members:

- 1) The lens cover has serves to cover the lens when not in use. There is a small post extending from the lens housing, which serves to rotate the lens cover such that the lens is in the covered position when rotating one direction and uncovered when rotating it the opposite direction. Thus, when the user is finished with their application, they need simply rotate the knob on the top of the phone 180 degrees to cover the lens.



2. The camera lens is attached to the blue housing as shown above. The radii of curvature on the lens is given by the simple lens formula:  $1/I + 1/o = 1/f = (n-1)(1/r1 + 1/r2)$ .
3. The mirrors could be made of glass or a reflective metal material. They are shown suspended, but in reality, one would be attached to the blue lens holder and the other would be attached to either the PCB or the front housing.
4. CCDs that could be used are made by Sony and many other companies.
5. The position switch consists of two spring contacts on the PCB which are shorted when the lens cover is turned 180 degrees from how it is pictured. The yellow pad represents a metallic element that would short the two contacts. This is one of many methods for performing the switching operation.
6. The detent holds the lens assembly so that it is either facing or opposing the front of the device. This is an optional, but useful part of the invention. It could be placed on either the PCB or the front housing.
7. The CPU takes the output from the CCD and displays, stores, or sends the information. In addition, it takes the output from the position switch and uses this information to flip the

Inventor's Full Signature	Date	Witnessed, read, understood and signed by	Date
(1) <i>Scott Vance</i>	JAN 11 '00	(1) <i>[Signature]</i>	000110
(2) <i>[Signature]</i>	JAN 11, 2000	(2) <i>[Signature]</i>	1/10/00
(3)		(3)	

<b>Prepared</b> RT/EUS/V Lens apparatus for camera phone – Scott Vance, Charles Hunt – 2-1386/ 2-7959	<b>Date</b> Jan 5, 2000	<b>Rev</b> A	<b>EUS no. (For Patent Engineering Use Only)</b> EUS03822
<b>Approved</b>	<b>Checked</b>		<b>File</b>

image when necessary before performing the task of displaying or otherwise using the information.

Additional Notes:

- 1) The phone is pictured with the element for turning the lens on the top of the phone. It could just as easily be incorporated into the side, front, back, or bottom of the phone.
- 2) This device might also be useful on digital phones for users who want to take self-portraits.

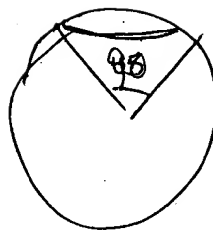
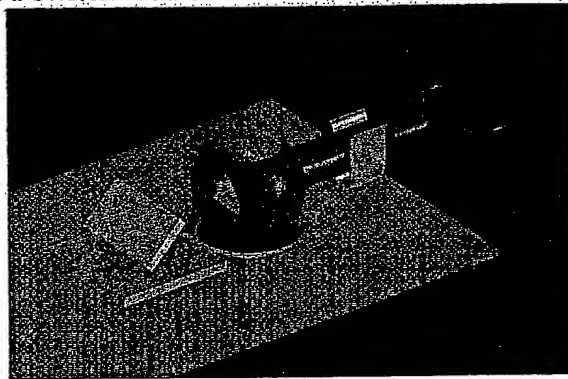


Front and rear views of the phone with the lens facing the front of the phone.

Inventor's Full Signature	Date	Witnessed, read, understood and signed by	Date
(1) <i>Scott Vance</i>	JAN 11 '00	(1) <i>[Signature]</i>	000110
(2) <i>[Signature]</i>	JAN 11, 2000	(2) <i>[Signature]</i>	1/10/00
(3)		(3)	

Prepared RT/EUS/V Lens apparatus for camera phone – Scott Vance, Charles Hunt – 2-1386/ 2-7959	Date Jan 5, 2000	Rev A	EUS no. (For Patent Engineering Use Only) EUS03822
Approved	Checked		File

- 3) The lens cover could be eliminated if the lens were placed in a closed position by rotating it 90° ~~45~~ degrees from the open position. If this were done, the knob on the top of the phone would be facing sideways unless an axially symmetric part were used. The axis of the turning member would be altered to have four flats as opposed to the two that were used on the design in the previous sections. It would also be advantageous to have a switch which recognized when the lens were facing the front, back, and sides of the phone. In its simplest form, such a switch would have three contacts.



Inventor's Full Signature	Date	Witnessed, read, understood and signed by	Date
(1) Scott P. Vance	JAN 11 '00	(1) [Signature]	000110
(2) [Signature]	JAN, 11, 2000	(2) [Signature]	1/10/00
(3)		(3)	